REMARKS

This Amendment responds to the Office Action dated January 11, 2007 in which the Examiner rejected claims 1-2 under 35 U.S.C. §102(b) and rejected claims 3-22 under 35 U.S.C. §103.

Applicants would like to thank the Examiner for the telephone interview on April 6, 2007 in which a discussion of the differences between *Susumu et al.* and the present invention were discussed.

As indicated above, claim 18 has been amended to correct a typographical error. Applicants respectfully request the Examiner approves the correction.

Claim 1 claims a device for protecting a bearing of an electrical machine against damaging passage of current, wherein the electrical machine comprises a stator and a rotor pivotally mounted relative to the stator by the bearing, the device comprising a compensation circuit and a coupling element. The compensation circuit is for producing a compensation current which compensates for a parasitic current arising during operation of the electrical machine and passing through the bearing. The compensation current has a corresponding magnitude as the parasitic current but opposite in phase to the parasitic current. The coupling element is for direct or indirect coupling of the compensation current into the bearing.

Through the structure of the claimed invention having a compensation circuit for producing a compensation current which compensates for a parasitic current arising during operation of the electrical machine and passing through the bearing where the compensation current has a corresponding magnitude as the parasitic current but opposite in phase to the parasitic current, as claimed in claim 1, the

claimed invention provides a device to actively compensating parasitic current. The prior art does not show, teach or suggest the invention as claimed in claim 1.

Claim 18 claims a device for protecting a bearing, which supports a rotor of an electrical machine, against passage of parasitic current arising from operation of the electrical machine, the device comprising means for producing a compensation current corresponding in magnitude to the parasitic current but opposite in phase to the parasitic current, and coupling means for coupling the compensation current into the rotor.

Through the structure of the claimed invention comprising a means for producing a compensation current corresponding in magnitude to the parasitic current but opposite in phase to the parasitic current as claimed in claim 18, the claimed invention provides a device for protecting a bearing by actively compensating for the parasitic current. The prior art does not show, teach or suggest the invention as claimed in claim 18.

Claims 1-2 were rejected under 35 U.S.C. §102(b) as being anticipated *Susumu et al.* (JP 10-014159).

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §102(b). The claims have been reviewed in light of the Office Action, and for reasons which will set forth below, Applicants respectfully request the Examiner withdraws the rejection to the claims and allows the claims to issue.

Susumu et al. appears disclose [0017] in Figure 3, a means for reducing or eliminating the shaft current Ij, a means 12a for reducing or eliminating the shaft voltage, which is formed by a resistor 13 and a capacitor 14, is disposed in the electrically closed circuit 11 formed between the electric motor 7, the inverter device

10, and the ground so as to be electrically in parallel with a grinding wire 15 of the electric motor 7. [0018] When the electric motor 7 is operated, electric charges 18 that correspond to and are opposite to electric charges 17 generates in the rotor 2 are accumulated in the stator iron core 1. Therefore, by removing the electric charges 18 accumulated in the stator iron core 1, the electric charges 17 generated in the rotor 2 are removed, so that the shaft voltage Vb generated between the shaft 3 penetrating the rotor 2 via the bearings 4 and the ground can be reduced. In order to remove the electric charges 18 in the stator iron core 1, the electric charges 18 in the stator iron core 1 is absorbed by the capacitor 14 through the resistor 13 or the means 12a for reducing or eliminating the shaft voltage from the frame 6 electrically and mechanically connected to the stator iron core 1. The resistance value R1 of the resistor 13 in this case satisfies the relationship expressed by Equation (2) by being compared with the resistance value R0 of the grounding wire 15, the resistance value R1 being a limit resistance in the case where the capacitor 14 is charged.

Thus, *Susumu et al.* merely discloses a means for reducing or eliminating shaft current (12) including a resistor 13 and a capacitor 14. Applicants respectfully submit that the means for reducing or eliminating shaft current is **<u>not</u>** a compensation circuit which <u>produces a compensation current</u> as claimed in claim 1. Rather, *Susumu et al.* only discloses a means for <u>reducing</u> the shaft current and <u>not</u> compensation therefore.

Additionally, *Susumu et al.* clearly discloses electric charges 18 generated in 4/6/07 ~~and~~ the stator iron core 1 are stored in the capacitor 14, and are discharged via the resistor 15 [0019]. Additionally, at paragraph [0019] *Susumu et al.* discloses the electric charges 18 are discharged via the resistor 15 before the next electric charge

18 are generated in the stator iron core 1. Nothing in *Susumu et al.* shows, teaches or suggests a compensation current has a corresponding magnitude as the parasitic current but opposite in phase to the parasitic current as claimed in claim 1. Rather, *Susumu et al.* only discloses removing electric charge by absorption through capacitor 14 and discharge by resistor 13.

Also, *Susumu et al.* discloses that the electric charges absorbed by the capacitor 14 and discharge by resistor 13 are discharged to ground as shown in Figure 3. Thus, nothing in *Susumu et al.* shows, teaches or suggests a coupling element coupling the compensation current into the bearing as claimed in claim 1. Rather, electric charge in *Susumu et al.* is removed and discharged to ground.

Additionally, Applicants respectfully submit that *Susumu et al.* merely discloses keeping the shaft voltage low by discharging the stator iron core 1. Nothing in *Susumu et al.* shows, teaches or suggests a compensation current is fed to the shaft to compensate the parasitic current caused by the shaft voltage. Applicants respectfully submit that the present invention does not aim to keep the shaft voltage low, but instead neutralizes the parasitic current driven by the shaft voltage so that it cannot harm the shaft bearing. This is done by a compensation current of the same magnitude but opposite phase being coupled to the shaft. By adding together the parasitic current and the compensation current, no net current flow results. Nothing in *Susumu et al.* shows, teaches or suggests two current annihilating each other.

Also, *Susumu et al.* merely discloses capacitor 14 which absorbs electric charges from the stator iron core 1 via the resistor 13. *Susumu et al.* does not disclose a coupling means for coupling the compensation current into the bearing as

claimed in claim 1. Rather, the capacitor 14 absorbs electric charges in the stator iron core 1.

Finally, *Susumu et al.* only discloses a capacitance Cw of the stator winding 5 and the shaft 3. This is not a coupling element for coupling a compensation current but in fact only represents the capacitance of the stator winding 5 and the shaft 3. Applicants respectfully point out *Susumu et al.* merely discloses a passive suppression of parasitic shaft current by attenuation, filtering, etc., while the claimed invention actively compensates the parasitic shaft current by superimposing a compensation current.

Since nothing in *Susumu et al.* shows, teaches or suggests a) a compensation circuit producing a compensation current which compensates for parasitic current, b) a compensation current has a corresponding magnitude as the parasitic current but opposite in phase to the parasitic current and c) a coupling element coupling the compensation current into the bearing as claimed in claim 1, Applicants respectfully request the Examiner withdraws the rejection to claim 1 under 35 U.S.C. §102(b).

Claim 2 depends from claim 1 and recites additional features. Applicants respectfully submit that claim 2 would not have been obvious within the meaning of 35 U.S.C. §102(b) at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claim 2 under 35 U.S.C. §102(b).

Claim 3 was rejected under 35 U.S.C. §103 as being unpatentable over *Susumu et al.* in view of *Desai et al.* (U.S. Patent 6,449,567). Claims 4-10 were

rejected under 35 U.S.C. §103 as being unpatentable over *Susumu et al.* in view of *Desai et al.* and *Baumgarti et al.* (U.S. Patent 5,859,529).

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicants respectfully request the Examiner withdraws the rejection to the claims and allows the claims to issue.

As discussed above, since nothing in *Susumu et al.* shows, teaches or suggests the primary features as claimed in claim 1, Applicants respectfully submit that claims 3-10 would not have been obvious within the meaning of 35 U.S.C. §103 over *Susumu et al.* in view of the secondary references to *Desai et al.* and *Baumgarti et al.* Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 3-10 under 35 U.S.C. §103.

Claims 11-22 were rejected under 35 U.S.C. §103 as being unpatentable over *Susumu et al.* in view of *Baumgarti et al.*

Applicants respectfully traverse the Examiner's rejection of the claims under 35 U.S.C. §103. The claims have been reviewed in light of the Office Action, and for reasons which will be set forth below, Applicants respectfully request the Examiner withdraws the rejection to the claims and allows the claims to issue.

As discussed above, *Susumu et al.* merely discloses a means for reducing or eliminating shaft current by absorbing electrical charges, by a capacitor 14, which are then discharged through resistor 13 to ground. Nothing in *Susumu et al.* shows, teaches or suggests a) a means for producing a compensation current or b) the compensation current corresponds in magnitude to the parasitic current but opposite in phase to the parasitic current as claimed in claim 18. Rather, *Susumu et al.* only

discloses a means for reducing or eliminating shaft current by discharge through a capacitor 14, resistor 13 and ground.

Additionally, as discussed above, *Susumu et al.* only discloses capacitor 14 and a capacitance Cw formed between the stator winding 5 and the shaft 3. Nothing in *Susumu et al.* shows, teaches or suggests a coupling means for coupling the compensation current into a rotor as claimed in claim 18.

Baumgarti et al. appears to disclose a voltage transformer having increased dielectric strength for use in a low-voltage power switch. (Column 1, lines 4-6). An ohmic voltage divider comprising a first resistor R1 and a second resistor R2 is connected to each phase conductor of the network L1, L2 and L3. Resistors R1 can have a resistance value of 4 MΩ, for example, while resistors R2 have a resistance value of 40 kΩ. At the connecting point of resistors R1 and R2, the applied network voltage is thus divided in a ratio of 1:100. Resistors R1 possess a sufficient dielectric strength; a series connection of a plurality of resistors having a correspondingly lower resistance value can also be provided for increasing the dielectric strength. The voltages applied at the connecting points of resistors R1 and R2 are supplied in each case to an operational amplifier V1, whose output feeds the primary winding Wi of an inductive transformer T. The connection points K1, K2, K3 and K4 form the voltage transformer output. A measuring device ME is provided with corresponding contacts for connection to connection points K1, K2, K3 and K4. Measurement can be impeded by scattered-in interfering voltages if the voltage transformer is operated in a network without neutral conductors and the input circuit formed by the resistors is very highly resistive. In accordance with a further development of the invention, such interferences ("humming") can be rendered ineffective in that, to form an

artificial star point, the one ends of secondary windings W2 of inductive transformers T1 are directly connected to one another, and the other ends of secondary windings W2 are connected to one another in each case by way of a resistor R3, and an operational amplifier V2 operating as an impedance converter is switched in each case between secondary windings W2 and a measuring device. The measuring device ME obtains a reference potential through a connection to the artificial star point of resistors R3. (Column 2, lines 1-32).

Thus, *Baumgarti et al.* merely discloses forming an artificial start point by the one ends of the secondary windings W2 of inductive transformers T1 and directly connected to one another and the other ends of the secondary windings W2 are connected to one another in each case by way of resistor R3. In other words, *Baumgarti et al.* merely discloses a start point on the secondary side of the voltage transformer. Nothing in *Baumgarti et al.* shows, teaches or suggests any disclosure with regard to the phase of the voltage. Thus, nothing in *Baumgarti et al.* shows, teaches or suggests a) means for producing a compensation current, b) the compensation current corresponding in magnitude to a parasitic current but opposite in phase to the parasitic current and c) coupling means for coupling the compensation current into a bearing as claimed in claim 18. Rather, *Baumgarti et al.* merely discloses a start point on a secondary side of a voltage transformer T1.

The combination of *Susumu et al.* and *Baumgarti et al.* would not be possible since they are from different technical fields. Furthermore, *Susumu et al.* is directed to a method in which the rotational speed of a blade is regulated using an inverter device while *Baumgarti et al.* is directed to a voltage transformer. Furthermore, neither reference shows, teaches or suggests a) a means for producing a

compensation current, b) the compensation current corresponding in magnitude to a parasitic current but opposite in phase to the parasitic current and c) a coupling means for coupling the compensation current into a rotor as claimed in claim 18. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claim 18 under 35 U.S.C. §103.

Claims 11-17 and 19-22 recite additional features. Applicants respectfully submit that claims 11-17 and 19-22 would not have been obvious within the meaning of 35 U.S.C. §103 over *Susumu et al.* and *Baumgarti et al.* at least for the reasons as set forth above. Therefore, Applicants respectfully request the Examiner withdraws the rejection to claims 11-17 and 19-22 under 35 U.S.C. §103.

Thus it now appears that the application is in condition for reconsideration and allowance. Reconsideration and allowance at an early date are respectfully requested.

If for any reason the Examiner feels that the application is not now in condition for allowance, the Examiner is requested to contact, by telephone, the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed within the currently set shortened statutory period, Applicants respectfully petition for an appropriate extension of time. The fees for such extension of time may be charged to Deposit Account No. 02-4800.

In the event that any additional fees are due with this paper, please charge our Deposit Account No. 02-4800.

Respectfully submitted,

BUCHANAN INGERSOLL & ROONEY PC

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